


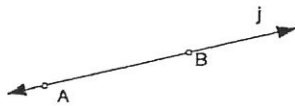
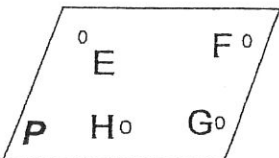
Name: _____

Date: _____

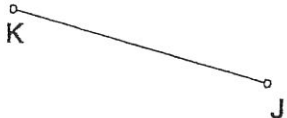
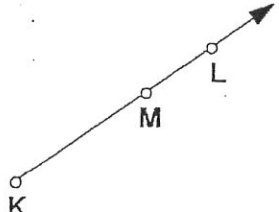
TERMS AND SYMBOLS IN GEOMETRY*Chapter 1, Section 1 (p. 6 – 11)*

Use your textbook to complete the charts below. DO NOT copy the descriptions/definitions "word for word," instead describe each in YOUR own words!

3 Undefined Terms in Geometry

Undefined Terms	Description	Example	How to Name It (Description and Example)
POINT	The smallest thing in geometry. . . it has no size! (Like a dot).		Named using the word "Point" and the letter next to the point. EX: Point A
			1. 2.
			1. 2.

Definitions of Other Geometric Terms

	Definition	Example	How to Name It (Description and Example)
Segment or Line Segment			
Ray			

Other Important Definitions

Collinear points - _____

Noncollinear points - _____

Draw an example of each.

Collinear Points	Noncollinear Points

Coplanar points - _____

Noncoplanar points - _____

Endpoint - _____

What two geometric figures have one or more endpoints? _____ and _____

Initial point - _____

What geometric figure has an initial point? _____

Opposite rays - _____

Draw and label a pair of opposite rays:

Intersection - _____

Draw two lines whose intersection is point A:

1. First describe what each of these symbols represents. Second draw each figure.

a. \overline{PQ}

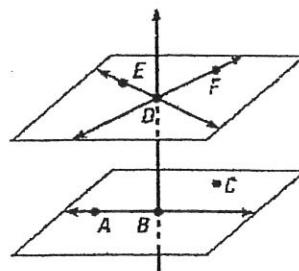
b. \overrightarrow{PQ}

c. \overleftrightarrow{PQ}

d. \overrightarrow{QP}

2. Use the picture at right to decide whether the statement is *true* or *false*.

- _____ Points A, B, and C are collinear
- _____ Points A, B, and C are coplanar.
- _____ Point F lies on \overleftrightarrow{DE} .
- _____ \overleftrightarrow{DE} lies on plane DEF.
- _____ \overleftrightarrow{BD} and \overleftrightarrow{DE} intersect.
- _____ \overleftrightarrow{BD} is the intersection of the plane ABC and plane DEF.



3. Identify each as being best modeled by a *point*, *line*, or a *plane*.

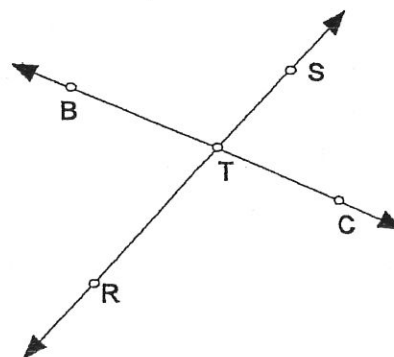
- | | |
|---------------------------|---------------------------|
| a. a star _____ | b. a notebook cover _____ |
| c. a ruler edge _____ | d. the tip of a pen _____ |
| e. a sheet of paper _____ | f. a letter opener _____ |

4. Tell whether each statement is true or false. If it is false, explain your reasoning.

- Two planes intersect in only one point. _____
- A ray starts at one point and goes on forever. _____
- \overline{AB} is the same segment as \overline{BA} . _____

5. Use the picture at right to decide whether each statement is *true* or *false*.

- C, T, and B are collinear. _____
- \overleftrightarrow{RS} is the same as \overleftrightarrow{RT} . _____
- C, T, and B name a plane. _____
- R, T, and C are collinear. _____
- Four rays start at T. _____



Name: _____

Date: _____

POINT, LINE, and PLANE POSTULATES

Chapter 1, Section 1 (p. 6 - 11)

POSTULATE:

DIRECTIONS: Complete the following postulates with the word or words that you *think* would make the statement true.

1. Through any 2 points there exists _____ line.
2. A line contains at least _____ points.
3. If two lines intersect, then their intersection is exactly one _____.
4. Through any 3 noncollinear points there exists _____ plane.
5. A plane contains at least 3 _____ points.
6. If two points lie on a plane, then the line containing them lies _____ the _____.
7. If two planes intersect, then their intersection is a _____.

PART 1: Use the pictures provided to help you answer each question. Use the correct notation when writing your answers.

1. What is the intersection of \overrightarrow{PN} and \overrightarrow{PQ} ? _____

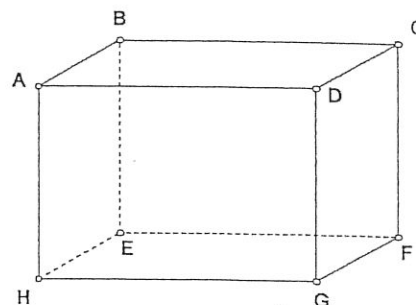
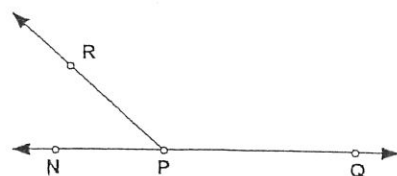
2. What is the intersection of \overline{NQ} and \overrightarrow{PQ} ? _____

3. What is the intersection of \overleftrightarrow{RP} and \overleftrightarrow{NP} ? _____

4. What is the intersection of plane ABE and plane GFE? _____

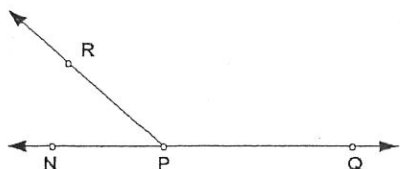
5. What is the intersection of \overline{DC} and \overline{CF} ? _____

6. What is the intersection of \overline{HG} and plane ADG? _____



PART 2: Name all the sets of points in each figure below that are collinear and three points that are noncollinear.

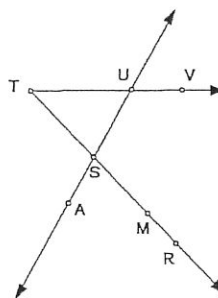
7.



Collinear points:

3 noncollinear points:

8.



Collinear points:

3 noncollinear points:

PART 3: Use the figure at right to answer each problem below.

9. Name three points that determine plane **R**.

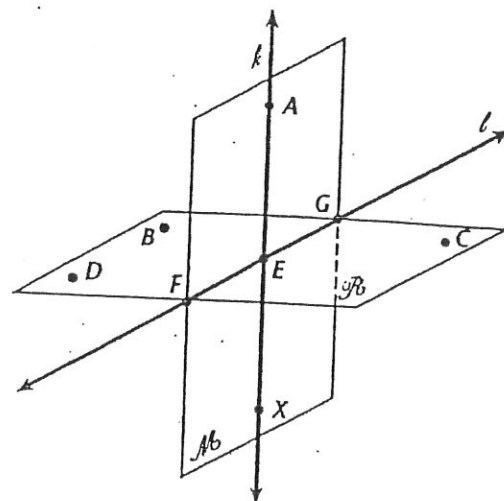
10. Name the intersection of plane **R** and plane **M**.

11. Name the intersection of line **l** and line **k**.

12. How many planes contain points B, D, and E?

13. How many planes contain points G, E, and F?

14. If line **k** is contained on plane **M**, then what points must be contained in plane **M**?



Name: _____

Date: _____

SECTION 1.2 → MEASURING SEGMENTS

What is the meaning of \overleftrightarrow{AB} ?

What is the meaning of AB ?

RULER POSTULATE: If points A and B are located on a NUMBER LINE, then . . .



$$AB = |x_2 - x_1|$$

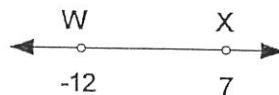
where x_1 and x_2 are the coordinates of A and B

EXAMPLE 1:



QR =

EXAMPLE 2:



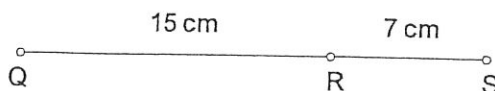
WX =

SEGMENT ADDITION POSTULATE:

- 1) You can add the lengths of two (or more) small segments to find the length of the larger segment.
- 2) If B is between A and C, then $AB + BC = AC$.

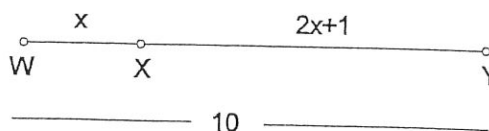


EXAMPLE 1:



QS =

EXAMPLE 2:



Find x and then find XY .

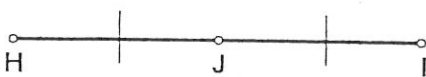
CONGRUENT SEGMENTS: Segments that have the SAME or EQUAL LENGTH.

** The symbol for congruent is \cong .

** To show that segments are congruent, we use tick marks.

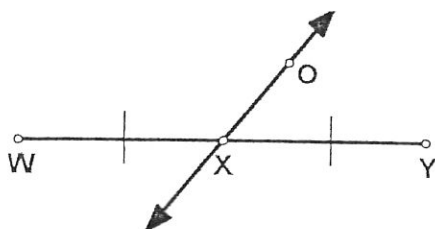
** If $\overline{AB} \cong \overline{CD}$, then $AB = CD$.

MIDPOINT: A point that divides a segment into two \cong segments.

EX:  J is the midpoint of \overline{HI} if . . .

SEGMENT BISECTOR: A geometric figure that divides a segment into two congruent parts,

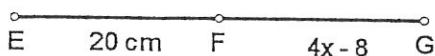
EX:



\overrightarrow{XO} bisects \overline{WY}
OR
 \overrightarrow{XO} is a segment bisector

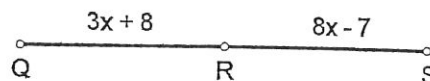
EXAMPLE #1:

F is the midpoint of \overline{EG} . Find x .



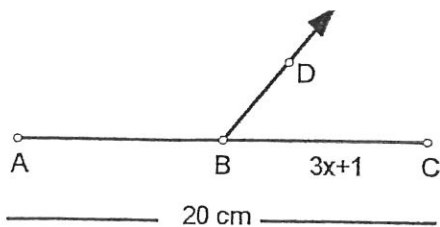
EXAMPLE #2:

R is the midpoint of \overline{QS} . Find x . Find SQ.



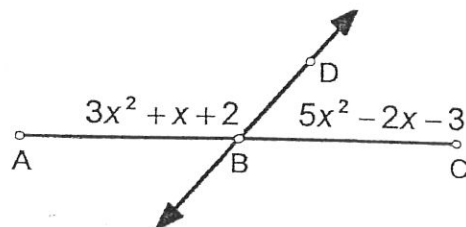
EXAMPLE #3:

\overline{BD} bisects \overline{AC} . Find x .



EXAMPLE #4:

\overline{BD} bisects \overline{AC} , Find AC.



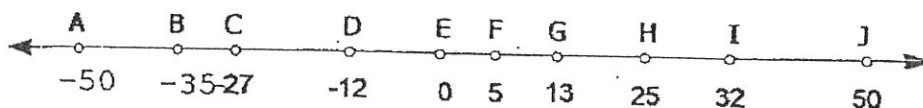
Name: _____

Date: _____

FINDING THE LENGTH OF SEGMENTS WITHOUT USING A RULER

Chapter 1, Section 2 (p. 13 – 19)

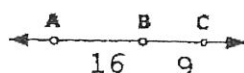
PART 1: FINDING THE LENGTH OF SEGMENTS USING A NUMBER LINE.



1. $EG =$ _____ 2. $IG =$ _____ 3. $HD =$ _____ 4. $BG =$ _____ 5. $AC =$ _____ 6. $BD =$ _____

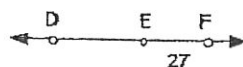
PART 2: THE SEGMENT ADDITION POSTULATE.

7.



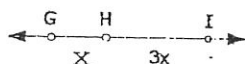
$AC =$ _____

8.



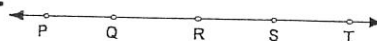
If $DF = 58$ units,
then $DE =$ _____

9.



If $GI = 60$ units,
then $x =$ _____.

10.

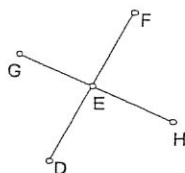


- $\overline{PR} \cong \overline{RT}$ _____
- S is the midpoint of RT
- $QR = 4$ units
- $ST = 5$ units

$RS =$ _____ $RT =$ _____

$PR =$ _____ $PQ =$ _____

11.



- E is the midpoint of \overline{DF}
- $DE = 5x + 3$
- $EF = 33$

$x =$ _____

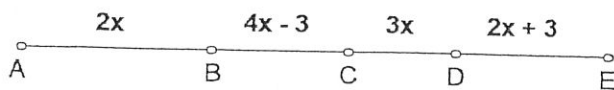
12. Point R lies between S & T.

- $ST = 79$ units
- $RS = 4y - 1$
- $RT = 7y + 3$

$RS =$ _____ $RT =$ _____

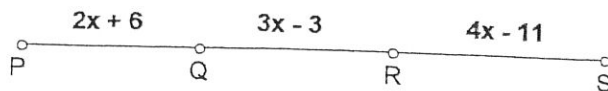
13. Given: \overline{BD} exceeds \overline{CE} by 10.

(HINT: This means that \overline{BD} is longer than \overline{CE}).



- A. What is the length of \overline{CD} ? _____
- B. Which is longer, \overline{AC} or \overline{CE} ? _____
- C. What is the total length of \overline{AE} ? _____

14.



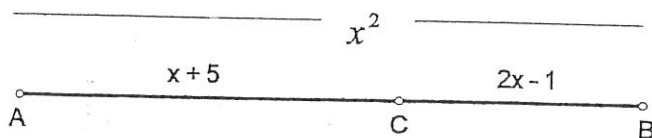
A. If R is the midpoint of \overline{QS} , what are:

PQ = _____ QR = _____ RS = _____

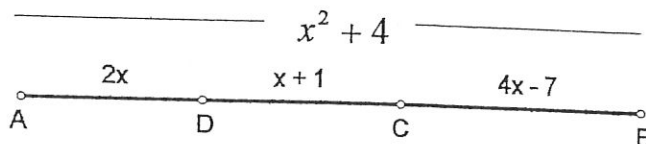
B. If $\overline{PR} \cong \overline{QS}$, what are:

PQ = _____ QR = _____ RS = _____

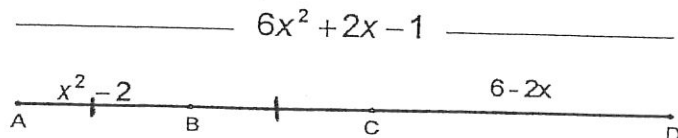
15. Find x .



16. Find x .



17. Find x and then find \overline{BD} .



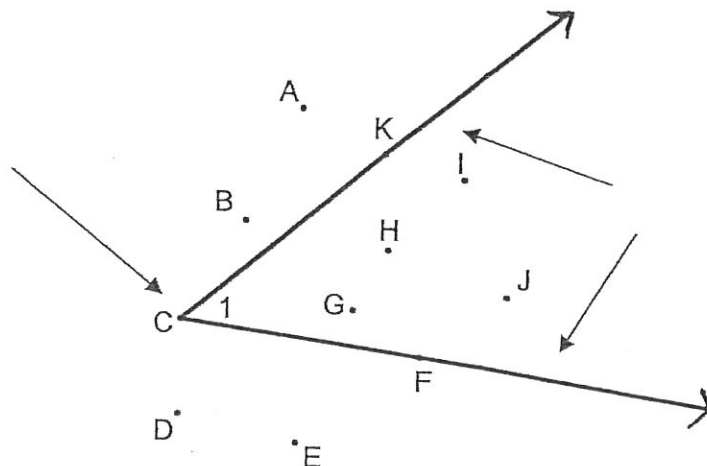
Name: _____

Date: _____

SECTION 1.3 – ANGLES AND THEIR MEASURES

Angle:

- Interior of an angle:
- Exterior of an angle:



3 Ways to Name an Angle

1.

2.

3.

Measuring an Angle

- * The measure of an angle is found using a _____.
- * Angles are measured in _____.
- * The measure of $\angle A$ is denoted by _____.

CONGRUENT ANGLES:

ANGLE ADDITION POSTULATE:

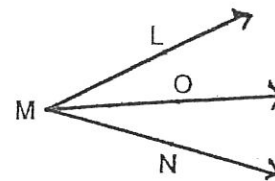
Types of Angles

1. Acute Angle:
2. Right Angle:
3. Obtuse Angle:
4. Straight Angle:
5. Adjacent Angles:

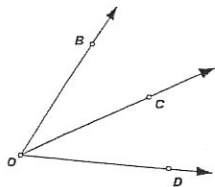
Angle Bisector:

EXAMPLES:

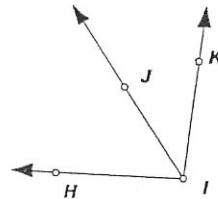
1. Name all the angles in the diagram at right.



2. If $m\angle BOC = 22^\circ$ and $m\angle BOD = 50^\circ$, then what is the measure of $\angle COD$?



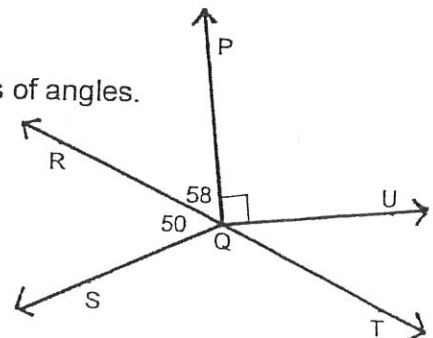
3. $m\angle KIJ = (2x + 6)^\circ$, $m\angle HIJ = (8x - 4)^\circ$, and $m\angle KIH = 62^\circ$. Find $m\angle KIJ$ & $m\angle HIJ$.



4. Y is a point in the interior of $\angle AOB$. Draw a sketch. Name the two adjacent angles.

5. Using the figure at right, find examples of each of the following types of angles.

- | | |
|------------------------------|---------------------|
| - 2 acute angles: | - 1 right angle: |
| - 2 obtuse angle: | - 1 straight angle: |
| - 1 pair of adjacent angles: | |



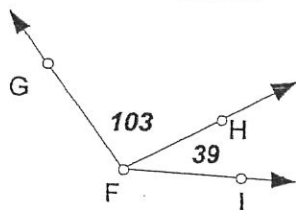
Name: _____

Date: _____

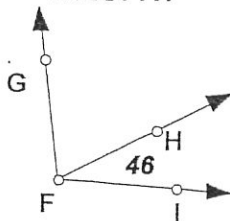
Angles and Their Measures Chapter 1, Section 3

PART 1: Use the Angle Addition Postulate to answer the following questions.

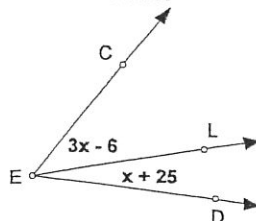
4. $m\angle GFI =$ _____



5. If $m\angle GFI = 93^\circ$, what is $m\angle GFH$? _____



6. If $m\angle CED = 39^\circ$, what is $m\angle CEL$? _____



7. $m\angle FUR =$ _____

$m\angle OUT =$ _____

$m\angle TUE =$ _____

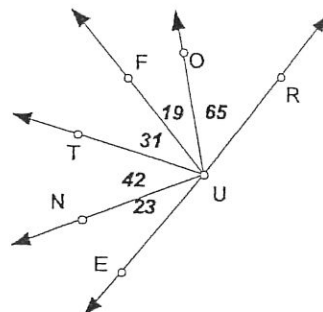
$m\angle EUR =$ _____

$\angle TUE \cong \angle$ _____

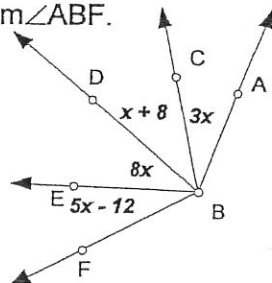
$m\angle RUN =$ _____

$m\angle NUF =$ _____

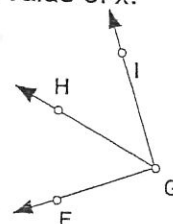
$m\angle FUE =$ _____



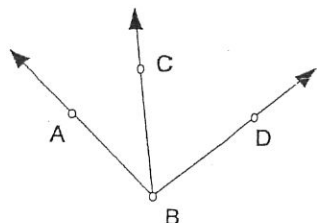
8. $m\angle CBE = 80^\circ$. Find $m\angle ABF$.



9. $m\angle IGH = (2x + 5)^\circ$, $m\angle FGH = (13x - 3)^\circ$, and $m\angle IGF = 62^\circ$. Find the value of x .



10. $m\angle DBC = (2x + 10)^\circ$, $m\angle ABC = (5x - 3)^\circ$, and $m\angle DBA = 70^\circ$. Find $m\angle DBC$ and $m\angle ABC$.



11. Q is on the interior of $\angle ROS$. S is on the interior of $\angle QOP$. P is on the interior of $\angle SOT$. $m\angle ROT = 127^\circ$, $m\angle SOT = 71^\circ$, and $m\angle ROQ = m\angle QOS = m\angle TOP$. Make a sketch and answer the following.

a. Find $m\angle QOP$

b. Find $m\angle QOT$

c. Find $m\angle ROQ$

d. Find $m\angle SOP$

12. \overrightarrow{KM} bisects $\angle JKL$.
 $m\angle JKM = (3x + 12)^\circ$
 $m\angle MKL = 41^\circ$
Find x .

13. \overrightarrow{BD} bisects $\angle ABC$.
 $m\angle ABD = (4x + 6)^\circ$
 $m\angle DBC = (7x - 12)^\circ$
Find x .
Find $m\angle ABC$.

PART 2: REVIEW OF THE SEGMENT ADDITION POSTULATE. Use the Segment Addition Postulate to answer the following questions.

14. Let A be between B and C. Solve for p , given the following information.

$$BA = 4p - 18$$

$$AC = 6p - 12$$

$$BC = 40$$

15. Let F be between G and H. Find the length of all three segments, given the following information.

$$GF = 6n - 45$$

$$FH = 7n - 30$$

$$GH = 2n + 46$$

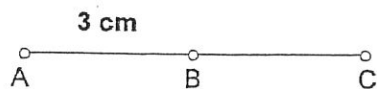
Name: _____

Date: _____

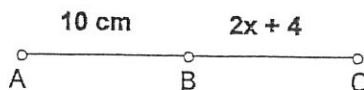
Sections 1.1 to 1.3 Practice

PART 1: SEGMENT AND ANGLE BISECTORS. In each problem below, B is the midpoint of \overline{AC} or \overline{BD} bisects $\angle ABC$. Find the specified value or length.

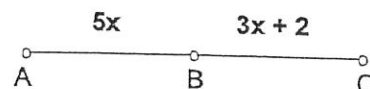
1. Find AC.



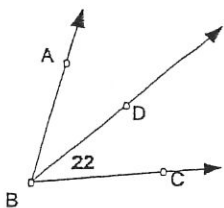
2. Find x.



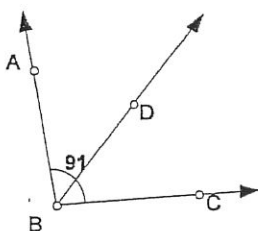
3. Find AC.



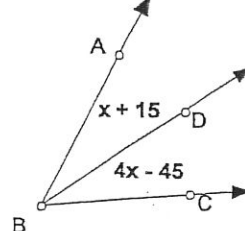
4. Find $m\angle ABC$.



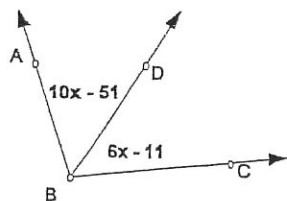
5. Find $m\angle ABD$.



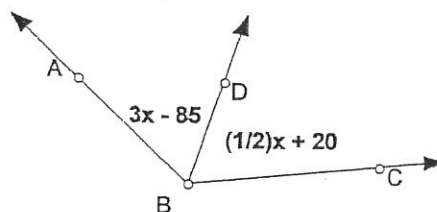
6. Find x.



7. Find x.



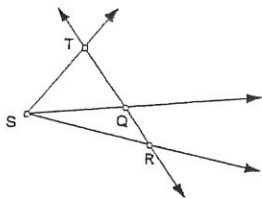
8. Find x.



Turn over →

PART 2: Answer each of the following *review* questions.

9. Name three points that are collinear.



A. Points T, Q, and S

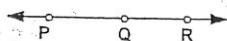
B. Points S, Q, and R

C. Points T, Q, and R

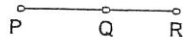
D. Points T, S, and R

10. \overrightarrow{PR} is represented by which sketch?

A.



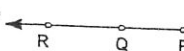
B.



C.



D.



11. The notation for the length of a segment between P and Q is ____.

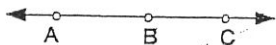
A. \overrightarrow{QP}

B. PQ

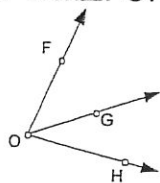
C. \overline{PQ}

D. \overleftrightarrow{PQ}

12. If $AB = 13$ and $AC = 27$, what is BC ?

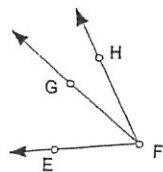


13. If $m\angle FOH = 58^\circ$ and $m\angle FOG = 30^\circ$, then what is $m\angle GOH$?



14. If F is between G and H, $GF = 5x + 28$, $FH = 7x + 20$, and $GH = 48$ cm, what is the value of x ?

15. $m\angle HFG = (2x + 6)^\circ$, $m\angle EFG = (12x - 1)^\circ$, and $m\angle HFE = 61^\circ$. What is $m\angle EFG$?



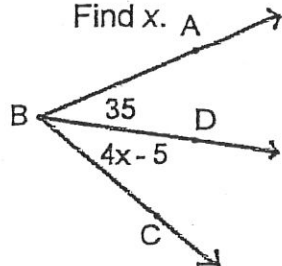
Name: _____

Date: _____

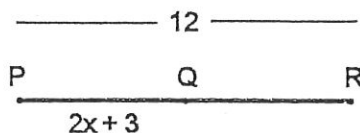
More Practice with Midpoints and Bisectors

DIRECTIONS: Use the given information and pictures to solve each problem below. Show your work. Circle your final answers.

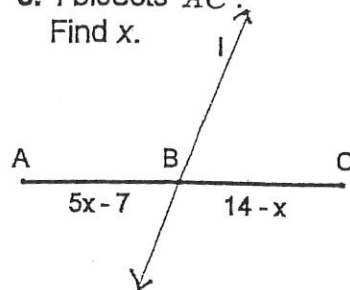
1. \overline{BD} bisects $\angle ABC$.
Find x .



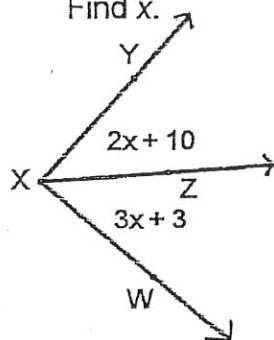
2. Q is the midpoint of \overline{PR} .
Find x .



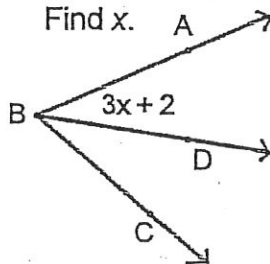
3. ℓ bisects \overline{AC} .
Find x .



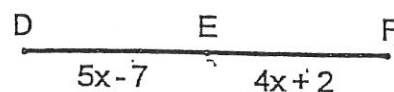
4. \overline{XZ} bisects $\angle YXW$.
Find x .



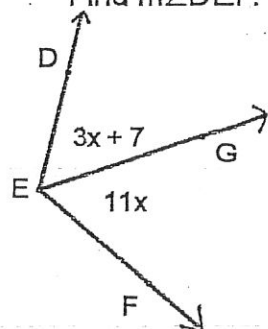
5. \overline{BD} bisects $\angle ABC$.
 $m\angle ABC = 4x + 12$.
Find x .



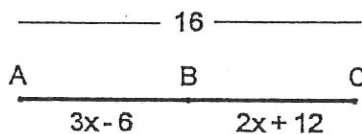
6. E is the midpoint of \overline{DF} .
Find DF .



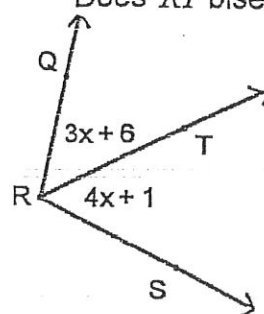
7. \overline{EG} bisects $\angle DEF$.
Find $m\angle DEF$.



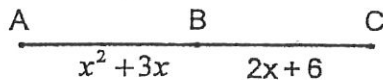
8. Is B the midpoint?



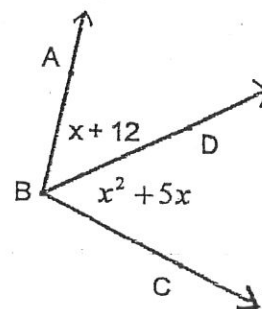
9. $m\angle QRS = 42^\circ$.
Does \overline{RT} bisect $\angle QRS$?



10. B is the midpoint of \overline{AC} .
Find x .
Find AC .



11. \overline{BD} bisects $\angle ABC$.
Find x .



Name: _____

Date: _____

SECTION 1.4 – PAIRS OF ANGLES
(p. 28 – 33)

DEFINITIONS

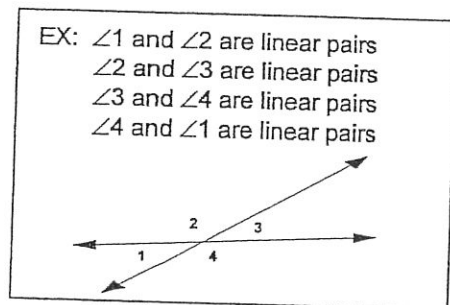
1) **COMPLEMENTARY ANGLES –**

COMPLEMENTS –

2) **SUPPLEMENTARY ANGLES –**

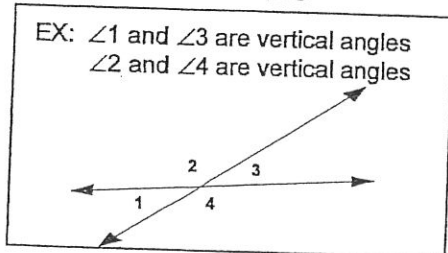
SUPPLEMENTS –

3) **LINEAR PAIRS –**



LINEAR PAIRS POSTULATE –

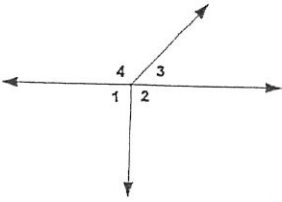
4) **VERTICAL ANGLES –**



VERTICAL ANGLE THEOREM –

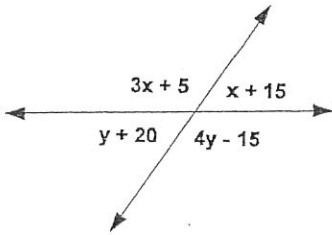
PRACTICE PROBLEMS

1)



- Are $\angle 2$ and $\angle 3$ linear pairs? Why or why not?
- Are $\angle 3$ and $\angle 4$ linear pairs? Why or why not?
- Are $\angle 1$ and $\angle 3$ vertical angles? Why or why not?

2.



- What is the value of x ?
- What is the value of y ?

3. $m\angle A = 50^\circ$
 $m\angle B = 19^\circ$
 $m\angle C = 110^\circ$

- What is the measure of the complement of $\angle A$? _____
- What is the measure of the supplement of $\angle A$? _____
- What is the measure of the complement of $\angle B$? _____
- What is the measure of the supplement of $\angle B$? _____
- What is the measure of the complement of $\angle C$? _____
- What is the measure of the supplement of $\angle C$? _____

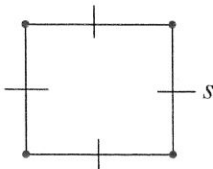
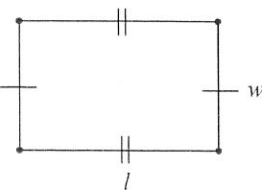
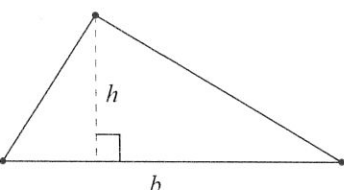
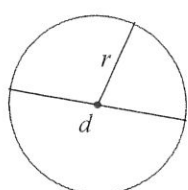
4. $\angle A$ and $\angle B$ are complementary angles. $m\angle A = 5x + 8$ and $m\angle B = x + 4$. Find the measure of each angle.

5. $\angle T$ and $\angle S$ are supplementary angles. $m\angle T$ is half the measure of $\angle S$. Find the measures of each angle.

Name _____

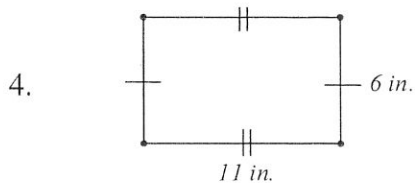
Date _____

Section 1.5 – Area Notes

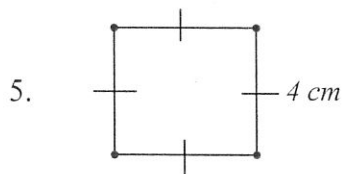
<u>Square</u>	<u>Rectangle</u>	<u>Triangle</u>	<u>Circle</u>
 <p>$s = \text{side}$</p>	 <p>$l = \text{length}$ $w = \text{width}$</p>	 <p>$h = \text{height}$ $b = \text{base}$</p>	 <p>$d = \text{diameter}$ $r = \text{radius}$</p>
Area = s^2	Area = $l w$	Area = $(\frac{1}{2})bh$	Area = πr^2
Perimeter = $4s$	Perimeter = $2l + 2w$		Circumference = $\pi d = 2\pi r$

I. Fill-In the Blank:

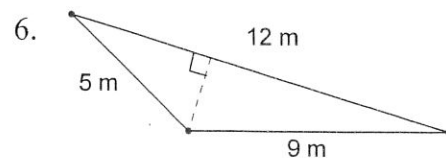
- The perimeter is the distance _____ a figure.
- The circumference is the distance around a _____.
- The _____ is the number of square units needed to cover the figure.

II. Find the Perimeter:

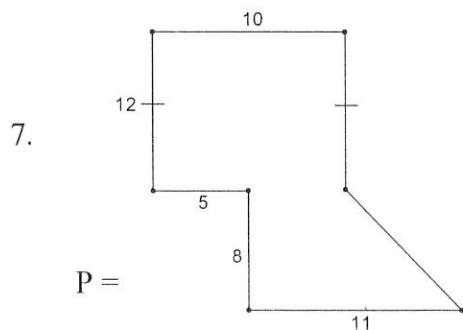
P =



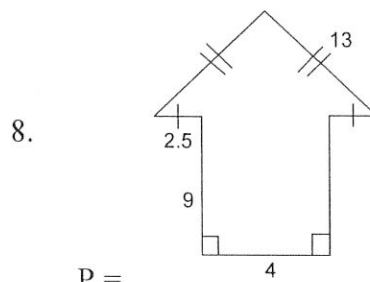
P =



P =



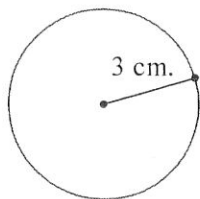
P =



P =

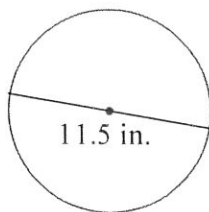
III. Find the Circumference:

9.



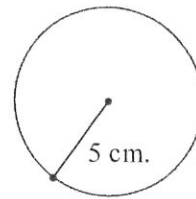
C =

10.



C =

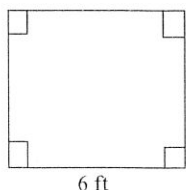
11.



C =

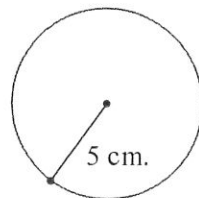
IV. Find the Area:

12.



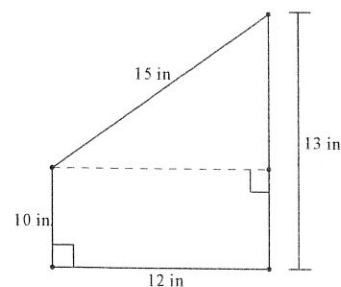
A =

13.



A =

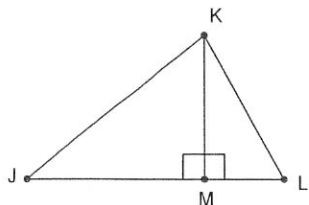
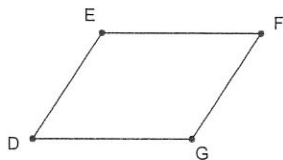
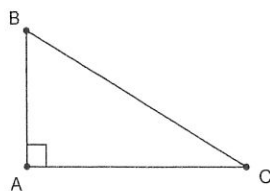
14.



A =

"Throw-Backs" Recall previous knowledge.

VI. Classify each angle as Acute, Obtuse, Right or Straight:



15. $\angle ABC$

16. $\angle BAC$

17. $\angle BCA$

18. $\angle DEF$

19. $\angle EFG$

20. $\angle EDG$

21. $\angle DGF$

22. $\angle JKM$

23. $\angle KML$

24. $\angle JML$

VI. Fill-In the Blank:

25. An _____ angle measures between 0° and 90° .

26. A right angle measures exactly _____.

27. An obtuse angle measures between _____ and _____.

28. A _____ angle measures exactly 180° .

Additional Practice: Textbook pg. 38 #10-21

Name: _____

Date: _____

CHAPTER 1 REVIEW

Terminology, Rules, and Other Things You Should Know

3 Undefined Terms in Geometry

Ray

Segment

Angle

Bisector

Midpoint

Angle and Segment Addition Postulates

Distance between point on a # Line

How to name geometric figures

Acute Angle

Obtuse Angle

Right Angle

Straight Angle

Adjacent Angles

Linear Pairs

Collinear and Noncollinear

Area formulas

Vertical Angles

Vertex

Intersection

Congruent

Complementary

Supplementary

Coplanar

Postulate

Format of Test

Worth a Total of 76 Points.

43 Questions

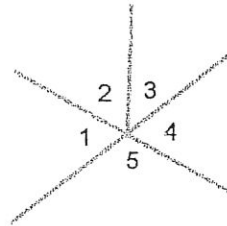
True/False

Multiple-Choice
Short Answer

Always, Sometimes, or Never
Math Problems involving segments and \angle s

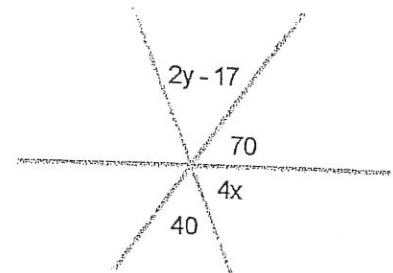
Practice Problems

Use this diagram
to answer #1 – 3.

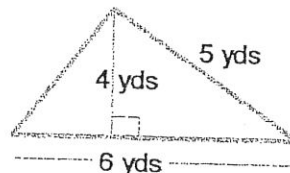


- Which angles form a linear pair?
 - $\angle 1$ and $\angle 2$
 - $\angle 1$ and $\angle 4$
 - $\angle 2$ and $\angle 3$
 - $\angle 3$ and $\angle 5$
 - $\angle 4$ and $\angle 5$
- Which angles are vertical angles?
 - $\angle 1$ and $\angle 2$
 - $\angle 1$ and $\angle 4$
 - $\angle 2$ and $\angle 3$
 - $\angle 3$ and $\angle 5$
 - $\angle 4$ and $\angle 5$
- Which angles are supplementary?
 - $\angle 1$ and $\angle 4$
 - $\angle 4$ and $\angle 5$
 - $\angle 1$ and $\angle 5$
 - Both B and C
 - All of these
- Two angles are complementary. One angle has a measure that is twice the other angle. What is the measure of the larger angle?

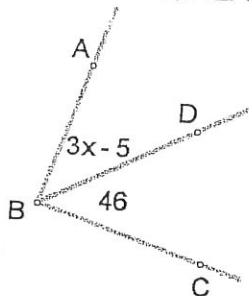
- Using the figure at the right, find the value of y .



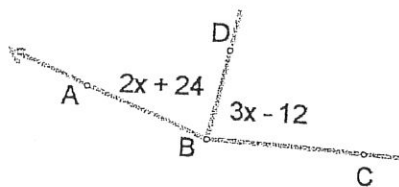
- Find the area of the figure at right.



7. \overrightarrow{BD} bisects $\angle ABC$. Find the value of x .

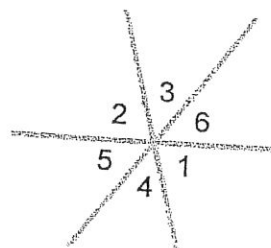


8. \overrightarrow{BD} bisects $\angle ABC$. Find the value of x .



9. Use the diagram at right to complete each statement.

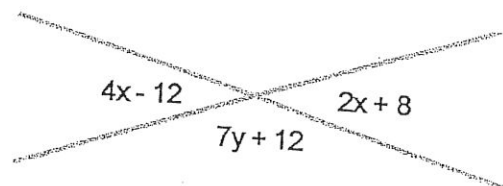
- A. If $m\angle 1 = 37^\circ$, then $m\angle 2 = \underline{\hspace{2cm}}$.
 B. If $m\angle 4 = 72^\circ$ and $m\angle 5 = 43^\circ$, then $m\angle 1 = \underline{\hspace{2cm}}$.
 C. If $m\angle 2 = m\angle 6 = x^\circ$, then $m\angle 3 = \underline{\hspace{2cm}}$.



10. Find the value of x and y .

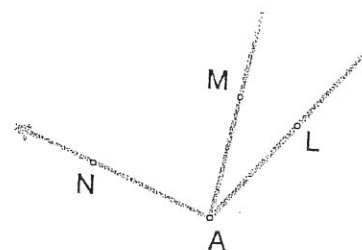
$x = \underline{\hspace{2cm}}$

$y = \underline{\hspace{2cm}}$



11. In the figure at right, $m\angle MAN = 17x + 3$, $m\angle MAL = 9(x - 3)$, and $m\angle NAL = 3(7x + 2)$.

- A. Find x . $\underline{\hspace{2cm}}$
 B. Find $m\angle MAN$. $\underline{\hspace{2cm}}$
 C. Find $m\angle NAL$. $\underline{\hspace{2cm}}$



12. If $DE = 91$, find the indicated values.

- A. $x = \underline{\hspace{2cm}}$
 B. $DC = \underline{\hspace{2cm}}$
 C. $CE = \underline{\hspace{2cm}}$



Answers to Practice/Review Problems

- | | | |
|----------------------|------------------|----------------|
| 1. E | 7. 17 | |
| 2. B | 8. 36 | |
| 3. D | 9. a. 37° | b. 65° |
| 4. 60° | 10. $x = 10$ | c. $180 - 2x$ |
| 5. 28.5 | 11. a. 6 | b. 105° |
| 6. 12 yd^2 | 12. a. 30 | b. 26 units |
| | | c. 132° |
| | | c. 65 units |

Introducing Points, Segments, Rays, and Lines

In this activity you'll experiment with drawing, dragging, measuring, and labeling points, segments, rays, and lines. These objects, along with circles, are the building blocks of most geometric constructions.

SKETCH AND INVESTIGATE: POINTS AND SEGMENTS

Note: If at any time you think you've made a mistake or you want to do something differently, you can always undo as many steps as you like. The **Undo** and **Redo** commands are in the Edit menu.



By default, point labels start with A.



1. Choose the **Point** tool and click in the sketch to construct a point. Click again to construct a second point. Notice that the most recently constructed point is *selected*: It appears with an outline.

2. Choose the **Selection Arrow** tool and click in a blank area in the sketch. This deselects everything.

3. Choose the **Text** tool. Position the finger over a point, then click to display that point's label. Display the other point's label, too.

A

B

4. With the **Selection Arrow** tool, click on both points. Now both points should be selected.



5. In the Measure menu, choose **Distance**.

AB = 2.72 cm

6. Drag one of the points and observe the measurement.

A

B

Q1 How can you make the distance between the two points zero?

7. Choose the **Segment** tool and draw a segment connecting the two points. You'll see a triple segment at first, indicating that the segment is selected.

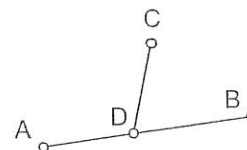


8. With the segment selected, go to the Measure menu and choose **Length**.

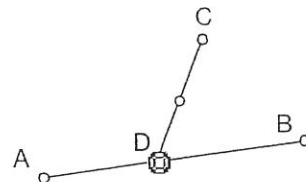
9. Use the **Selection Arrow** tool to drag either endpoint of the segment.

Q2 How does the length of a segment compare to the distance between its endpoints?

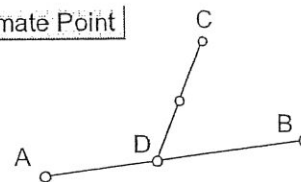
10. Use the **Segment** tool to construct a second segment with one endpoint attached to the first segment. To do this, click the mouse button first when the pointer is in a blank area of the sketch, then when it's directly on the original segment.



11. Use the **Text** tool to show the labels of this segment's endpoints.
 12. Use the **Selection Arrow** tool to drag point D to confirm that it is attached to \overline{AB} .
 13. Select \overline{CD} (the segment, not its endpoints), then go to the **Construct** menu and notice what choices are available. Choose **Midpoint**.
 14. Click in a blank area to deselect everything.
 15. Select point D .
 16. In the **Edit** menu, drag to the **Action Buttons** submenu and choose **Animation**. You'll get a dialog box you can use to specify animation settings. To choose the default settings, click **OK**. You've created an Animation action button in your sketch.
 17. Press the action button (by clicking on it) to start the animation.
 18. Press the button again to stop the animation.
 19. Select the midpoint; then, in the **Display** menu, choose **Trace Midpoint**.
 20. Press the Animation button again and observe the path that the midpoint traces.
- Q3** Describe the path that the midpoint traces as point D moves back and forth.

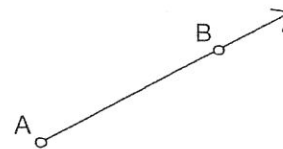
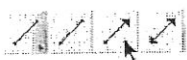


Animate Point



SKETCH AND INVESTIGATE: RAYS AND LINES

21. In the **File** menu, choose **New Sketch**.
 22. Press and hold down the mouse button on the **Segment** tool. A palette of **Straightedge** tools will pop out to the right. Drag right and choose the **Ray** tool.
 23. Draw a ray in your sketch. Notice that the ray extends in one direction beyond the edge of your sketch window.
 24. Use the **Text** tool to show the labels of the ray's control points.
 25. Use the **Selection Arrow** tool to drag each point to observe how it controls the ray.
- Q4** A ray with endpoint A that passes through a point B is called ray AB (represented symbolically as \overrightarrow{AB}). Could it also be called ray BA ? Explain.



Introducing Points, Segments, Rays, and Lines

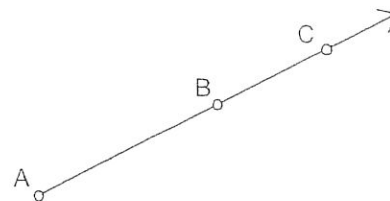
continued

26. Select the ray and go to the Measure menu. Note that **Length** is grayed out.

Q5 Why do you think you can't measure the length of a ray?

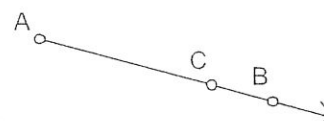
27. With the ray still selected, go to the Construct menu and look at your choices. Choose **Point On Ray**.

Q6 Why can't you construct the midpoint of a ray?



28. Drag this new point to see how its behavior compares to that of the ray's two control points.

Q7 Give two different names to the ray shown at right. Use just two points in each name.

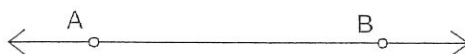


29. Press and hold down the **Ray** tool, then drag right to choose the **Line** tool.

30. Experiment with drawing lines in your sketch.

Q8 List all the similarities and differences you can between segments, rays, and lines.

Q9 Name two rays and a segment that lie on the line below.



Q10 In Sketchpad, construct a line without using the **Line** tool. Explain what you did. Does your line remain a line when you drag points?

Geometry CP

Coordinate Geometry

(Sections 1.6, 3.5, 3.6)

Name _____

Date _____

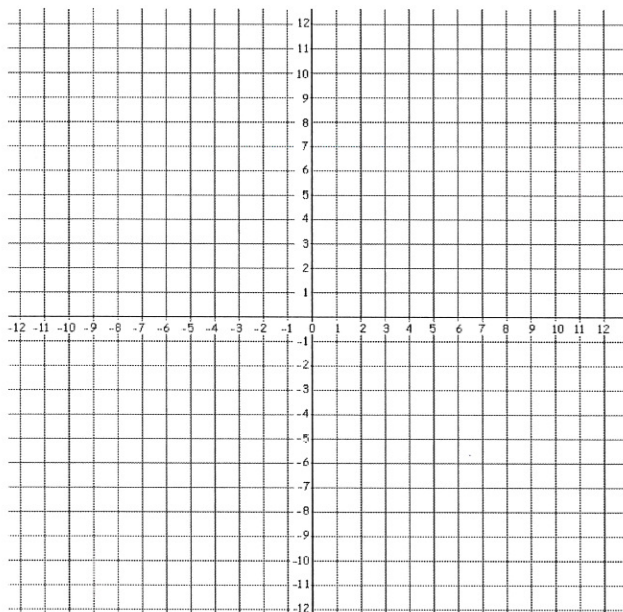
1.6 Notes: Distance and Midpoints in the Coordinate Plane (p.43-49)*Objectives:**Find the coordinates of the midpoint of a segment in the coordinate plane, using the Midpoint Formula.**Use the Distance Formula to find the distance between two points in the coordinate plane.*

The _____ is a plane divided into four regions by a horizontal line and a vertical line. The four regions are called _____. The horizontal line is known as the _____, and the vertical line is known as the _____. The location, or _____, of a point are given by an ordered pair (_____ , _____).

Use the coordinate plane to label the vocabulary and plot the following points.

LABEL THE COORDINATE PLANE:

Quadrant I Quadrant II
 Quadrant III Quadrant IV
 origin x-axis
 y-axis

**PLOTTING POINTS:**

A (-2 , 5)
 B (9 , -7)
 C (4 , 2)
 D (-1 , -8)
 E (0 , 5)
 F (-3 , 0)

DISTANCE FORMULA:

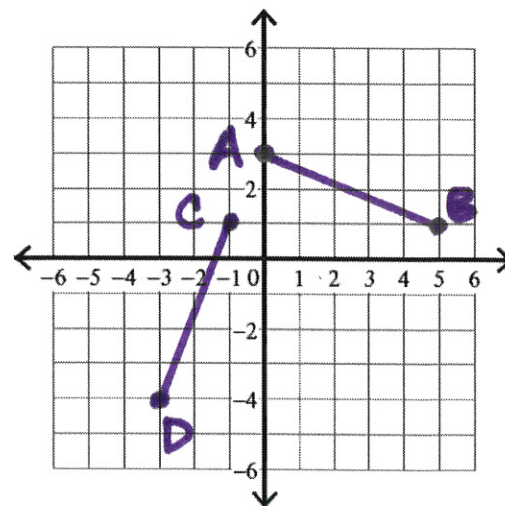
The distance formula is used to calculate the distance between two points in a coordinate plane.

The distance between two points (x_1, y_1) and (x_2, y_2) can found by

$$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

a) A(0,3) and B(5,1). Find AB.

b) C(-1,1) and D(-3,-4). Find CD.



MIDPOINT FORMULA:

You can find the midpoint of a segment in a coordinate plane by using the coordinates of the endpoints.

Calculate the average of the x-coordinates and the y-coordinates.

The midpoint M of \overline{AB} with endpoints $A(x_1, y_1)$ and $B(x_2, y_2)$ can be found by

$$M\left(\frac{x_2 + x_1}{2}, \frac{y_2 + y_1}{2}\right)$$

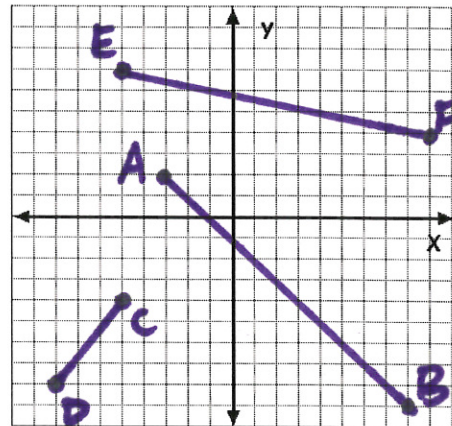
c) Find the coordinates of the midpoint of \overline{EF} with endpoints $E(-2, 3)$ and $F(5, -3)$.

d) M is the midpoint of \overline{JK} . J has coordinates $(2, 2)$, and M has coordinates $(4, -3)$. Find the coordinates of K .

Practice:

1. Find AB .

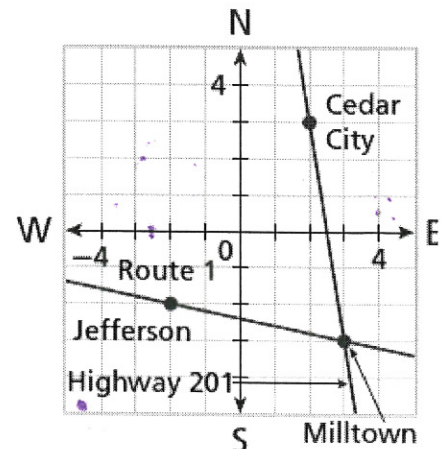
2. Find the coordinates of the midpoint of \overline{EF} .



On the map, each square of the grid represents 1 square mile. Find each distance to the nearest tenth of a mile.

3. Find the distance along Highway 201 from Cedar City to Milltown.

4. A car breaks down on Route 1, at the midpoint between Jefferson and Milltown. A tow truck is sent out from Jefferson. How far does the truck travel to reach the car?



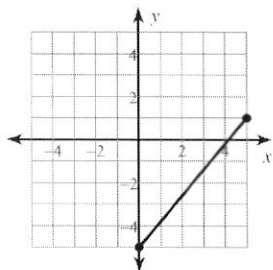
Name _____

Date _____

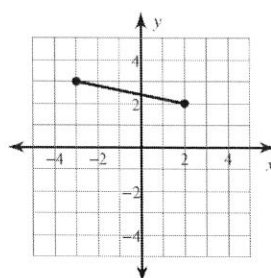
Distance and Midpoint Formula Practice

Directions: Find the Distance between the two points.

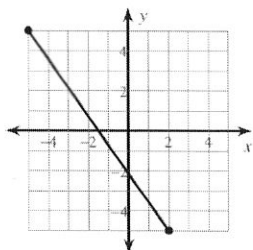
1.



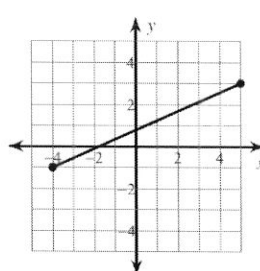
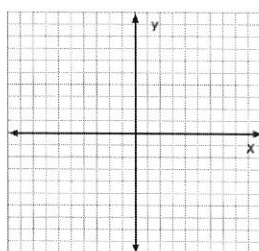
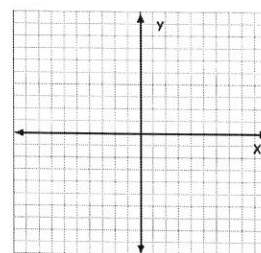
2.

3. $(3, 8), (9, 10)$ 4. $(-8, 10), (-6, 7)$ **Directions: Find the Midpoint between the two points. Use the graph to check your answer.**

5.

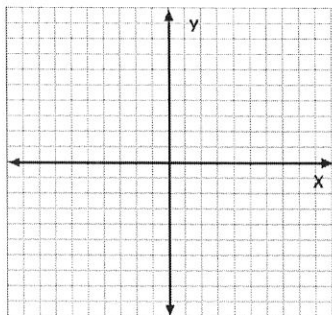


6.

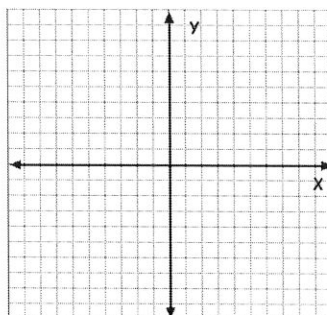
7. $(-4, 4), (5, -1)$ 8. $(-1, -6), (-6, 5)$ 

Directions: Find the **OTHER ENDPOINT** of the line segment with the given endpoint and midpoint

9. Endpoint: $(-1, 9)$, midpoint: $(-9, -10)$

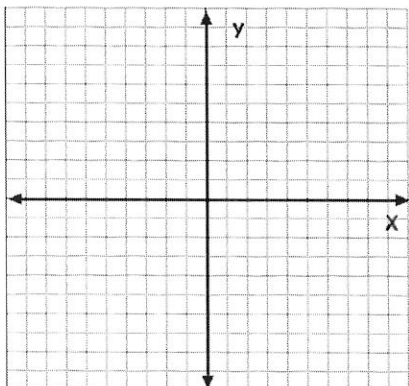


10. Endpoint: $(2, 5)$, midpoint: $(5, 1)$



Critical thinking:

11. On a map, with scale of 1 unit = 3.5 miles, the coordinates of John's house are $(-2, -8)$. The coordinates of Paul's house are $(1, -2)$. Paul's house is the midpoint between John's house and the library. How many **MILES** does Paul live from the Library?



Name _____

Date _____

3.5 Notes: Slopes of Lines (p.182-187)*Objectives:**Find the slope of a line.**Use the slopes to identify parallel and perpendicular lines.*

The _____ of a line is a number that describes the steepness of the line. The slope of a line is the ratio of _____ over _____. Any two points on a line can be used to calculate the slope of the line containing those points.

The rise is the difference in the _____ of two points on a line.

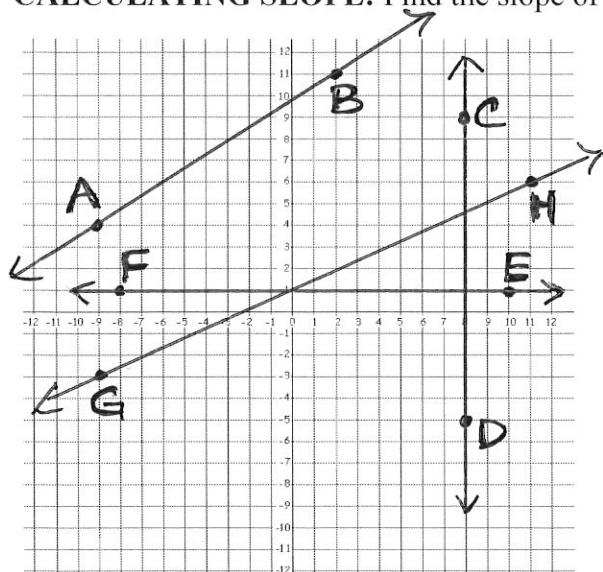
The run is the difference in the _____ of two points on a line.

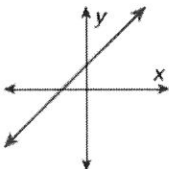
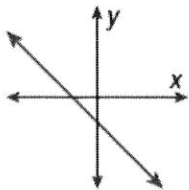
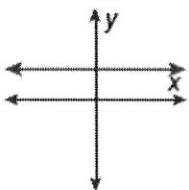
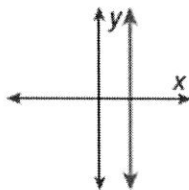
SLOPE FORMULA:

If $P_1(x_1, y_1)$ and $P_2(x_2, y_2)$ are two points on a line, then the slope, m , of the line is calculated by the formula:

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

CALCULATING SLOPE: Find the slope of the indicated lines.

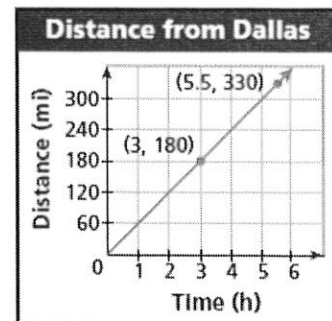
a) \overleftrightarrow{AB} b) \overleftrightarrow{CD} c) \overleftrightarrow{EF} d) \overleftrightarrow{GH}

<i>Positive Slope</i>	<i>Negative Slope</i>	<i>Zero Slope</i>	<i>Undefined Slope</i>
			

Application: Rate of Change in Miles per Hour (mph)

Tony is driving from Dallas, Texas to Atlanta, Georgia. At 3:00pm, he is 180 miles from Dallas. At 5:30pm, he is 330 miles from Dallas. Find and interpret the slope of the line.

- a) What was Tony's average speed in miles per hour.
- b) If Tony's average speed stay the same, how far will he have traveled by 6:30pm.



SLOPES OF PARALLEL AND PERPENDICULAR LINES:

PARALLEL LINES THEOREM: Parallel lines have the _____ slope.

- Any two vertical lines are _____.
- Any two horizontal lines are _____.

PERPENDICULAR LINES THEOREM:

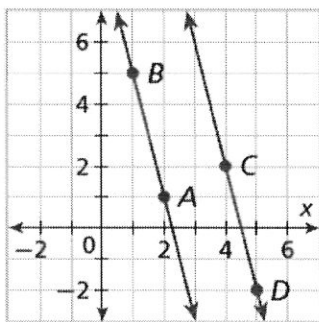
Perpendicular lines have _____ slopes.

- _____ and _____ lines are perpendicular.

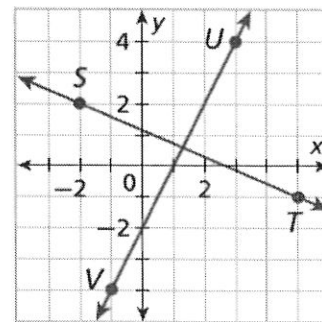
DETERMINING IF LINES ARE PARALLEL, PERPENDICULAR OR NEITHER.

Use the slopes of the lines to determine if the lines are parallel, perpendicular or neither.

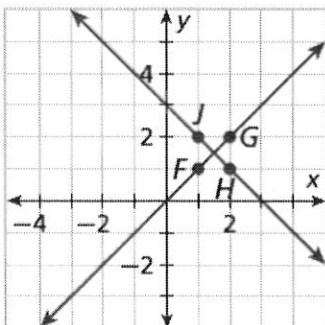
a) \overleftrightarrow{AB} and \overleftrightarrow{CD}



b) \overleftrightarrow{ST} and \overleftrightarrow{UV}



c) \overleftrightarrow{FG} and \overleftrightarrow{HJ}



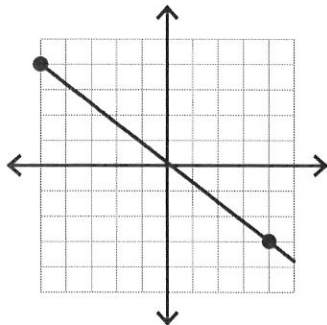
d) \overleftrightarrow{WX} and \overleftrightarrow{YZ} for W(3,1), X(3,-2),
Y(-2,3), and Z(4,3)

Finding Slope From a Graph

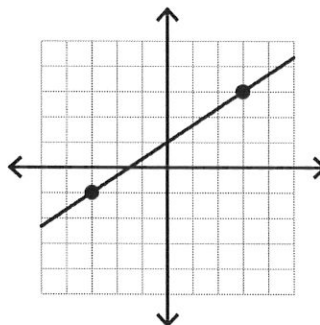
Date _____ Period _____

Find the slope of each line.

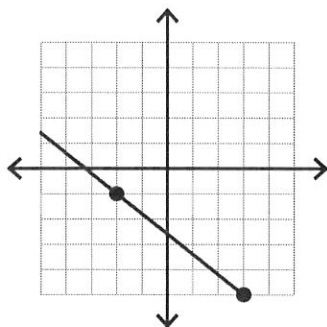
1)



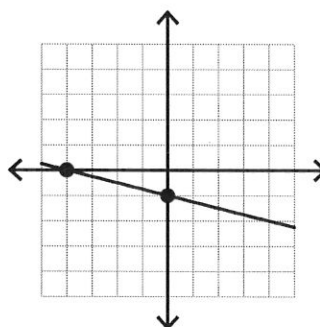
2)



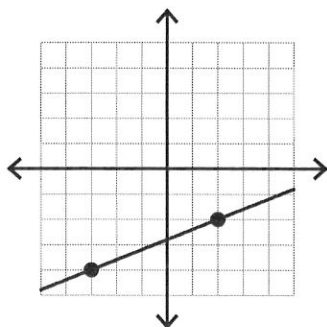
3)



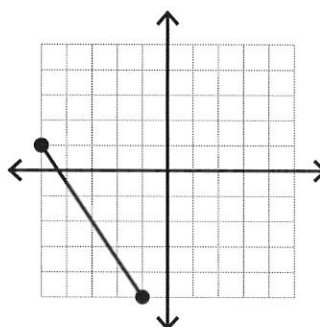
4)



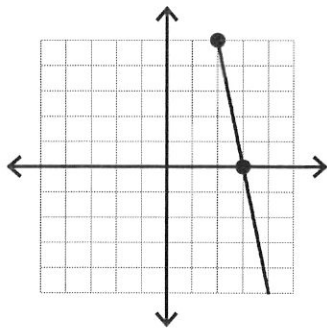
5)



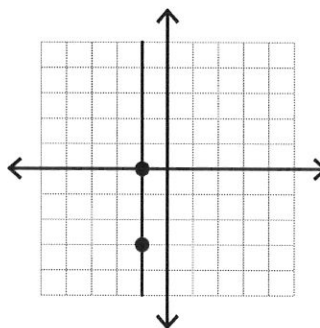
6)



7)



8)



3.6 Graphing Lines in the Coordinate Plane (p.190-197)

Objectives: Graph lines in the coordinate plane.

Find the equation of a line given a point and a slope.

Find the equation of a line given two points.

Forms of the Equation of a Line

Slope-Intercept Form	$y = mx + b$	Equation of a line with slope <i>m</i> and y-intercept <i>b</i> .
Point-Slope Form	$(y - y_1) = m(x - x_1)$	The equation of a line passing through the point (x_1, y_1) with slope <i>m</i> .
HOY Horizontal Lines	$y = b$ * Example: $y = -3$	Where <i>b</i> is the y-intercept. Slope of a horizontal line = 0
VUX Vertical Lines	$x = a$ * Example: $x = 2$	Where <i>a</i> is the x-intercept. Slope of a vertical line is undefined.

Graphing Lines in the Coordinate Plane:

graph linear equations on the coordinate plane:

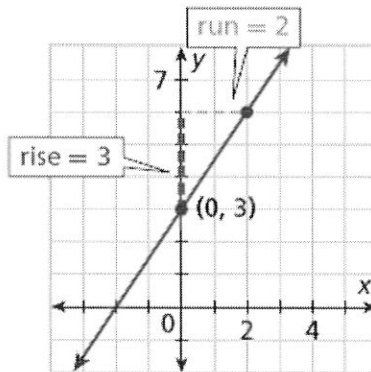
1. Rewrite the equation of the line in Slope-Intercept Form.
2. Plot the y-intercept, **b** on the coordinate plane.
3. From the y-intercept, use the slope to find additional points on that line.

Example: Graph $y = \frac{3}{2}x + 3$

The equation is given in slope-intercept form, with a slope of $\frac{3}{2}$ and a y-intercept of 3.

Plot the point $(0, 3)$ and then rise 3 and run 2 to find another point.

Draw the line containing the two points.

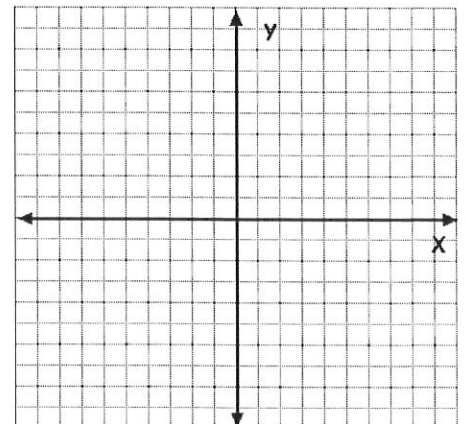


Try these:

Graph the lines on the coordinate plane.

A) $y = \frac{1}{2}x - 2$

B) $x = -3$



Writing the Equation of a Line in Slope-Intercept Form:

- When given a **point** (x_1, y_1) thru which a line passes and the **slope** m of the line, use the ***Point-Slope Form*** to find the equation of that line. Solve for y to write the equation in Slope-Intercept Form.

Example: Write the equation of the line passing thru $(-2, 1)$ with a **slope of 3**.

- When given two **points** (x_1, y_1) **and** (x_2, y_2) , first find the slope of the line passing thru those points. Then using the slope and one of the points, use the ***Point-Slope Form*** to find the equation of the line. Solve for y to write the equation in Slope-Intercept Form.

Example: Write the equation of a line passing thru the points $(8, -3)$ **and** $(-5, -7)$.

Try These:

Write the equation of the line passing thru $(-5, 2)$ with a **slope of** $-\frac{3}{2}$.

Write the equation of the line passing thru $(4, -6)$ with a **slope of 0**.

Write the equation of a line passing thru the points $(4, -1)$ **and** $(-1, -1)$.

Write the equation of a line passing thru the points $(6, -8)$ **and** $(6, 2)$.

Using the Graphing Calculator to Solve an Application:

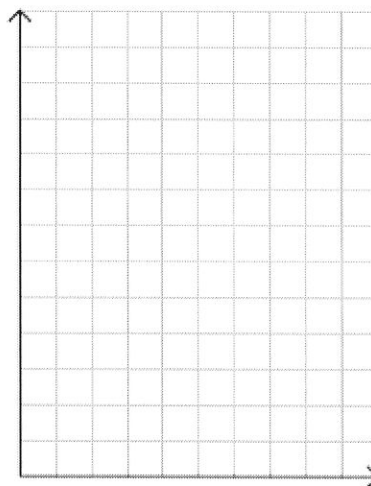
Problem-Solving Application

Audrey is trying to decide between two health club plans. After how many months would both plans' total costs be the same?

	Plan A	Plan B
Enrollment Fee	\$140	\$60
Monthly Fee	\$35	\$55

Plan A: $y = 35x + 140$

Plan B: $y = 55x + 60$



HW:

Graph the following lines on the coordinate plane.

1.) $y = 8$

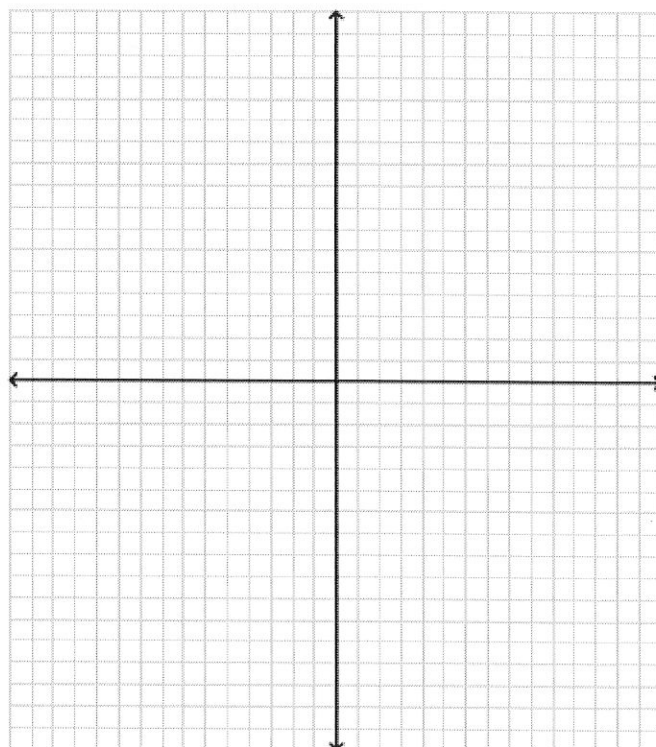
2.) $y = -\frac{3}{4}x - 7$

3.) $y = 5x - 2$

4.) $x = -9$

5.) $3x + 2y = 8$

6.) $12x - 6y = 36$



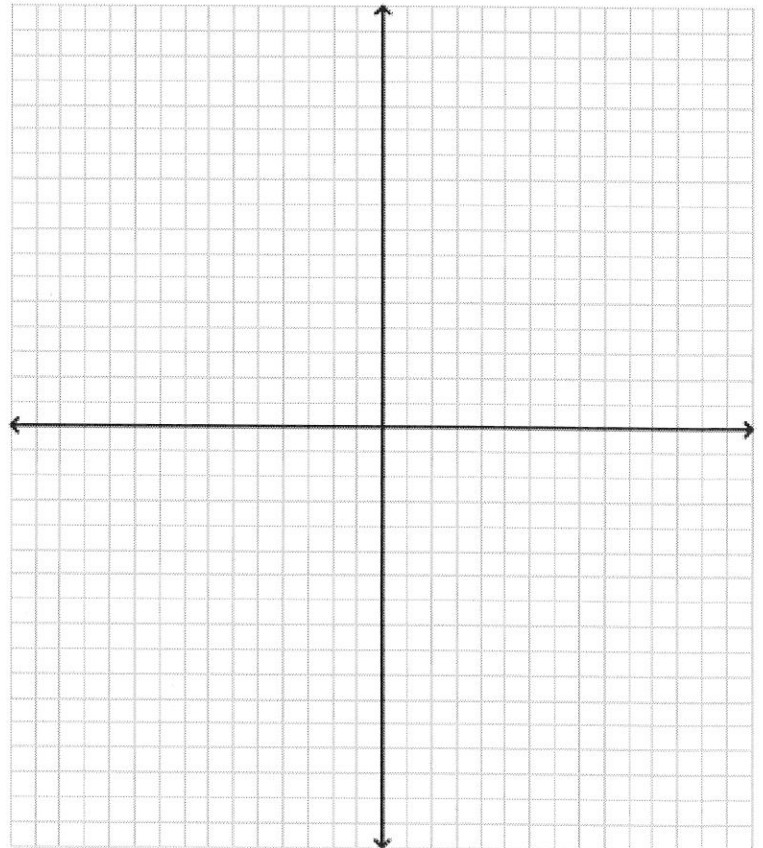
Write the equation of the lines in slope-intercept form. Graph and label the lines on the coordinate plane.

7.) Write the equation of line l passing thru $(-8, -3)$ with a slope of $-\frac{1}{5}$.

8.) Write the equation of line m passing thru $(5, 9)$ with an undefined slope.

9.) Write the equation of a line passing thru the points $A(7, 5)$ and $B(-2, -4)$.

10.) Write the equation of a line passing thru the points $C(-1, -3)$ and $D(6, -3)$.

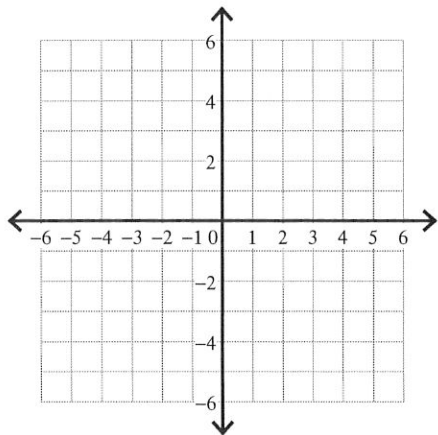


Graphing Lines

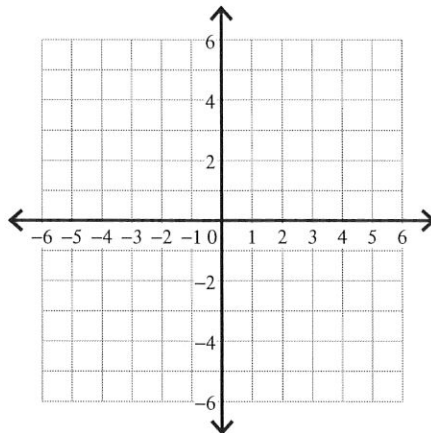
Date _____ Period _____

Sketch the graph of each line.

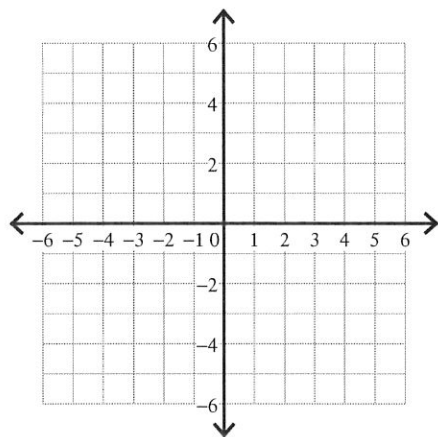
1) $y = -\frac{1}{5}x - 2$



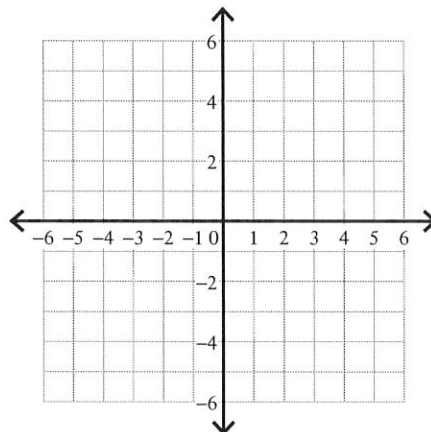
2) $y = -5x - 1$



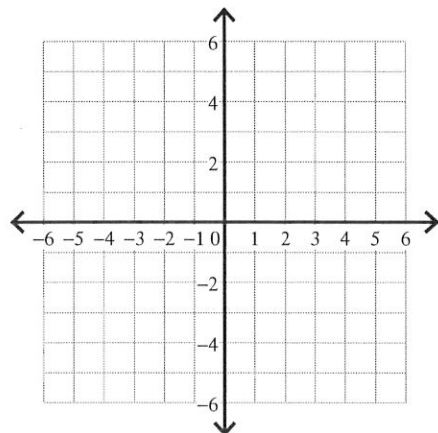
3) $y = -\frac{5}{2}x$



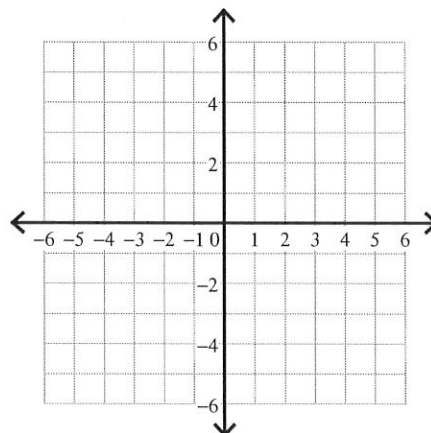
4) $y = -7x + 3$



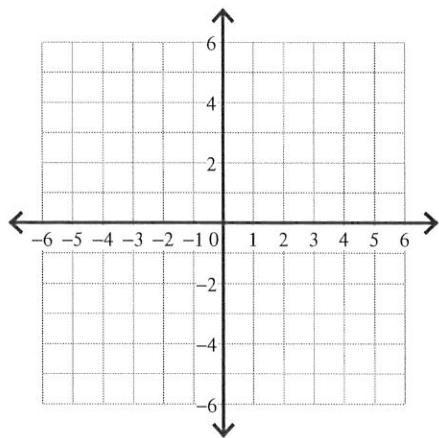
5) $y = 2x - 5$



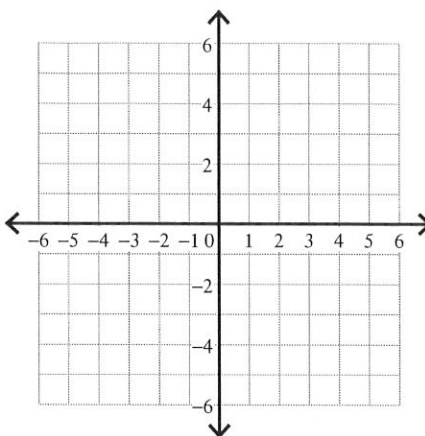
6) $y = -6x + 1$



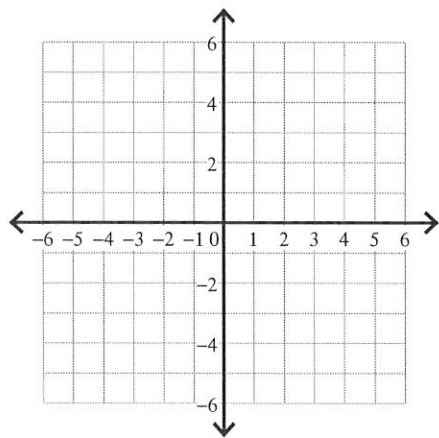
7) $y = -\frac{1}{3}x + 4$



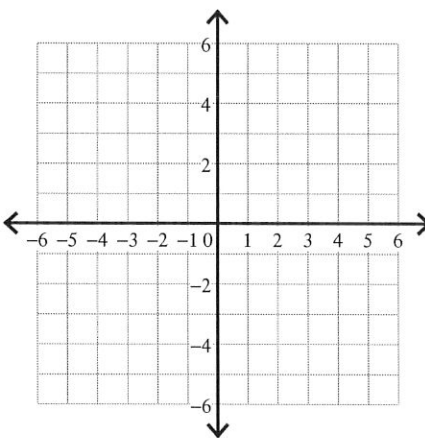
8) $y = 0$



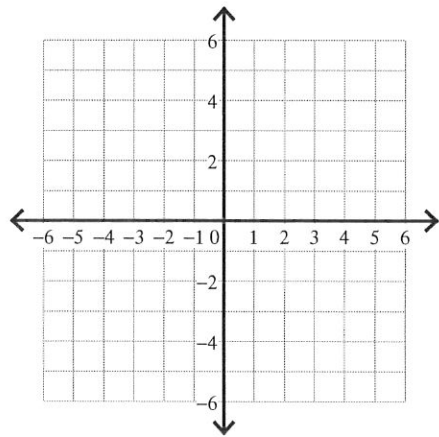
9) $y = -\frac{2}{5}x - 4$



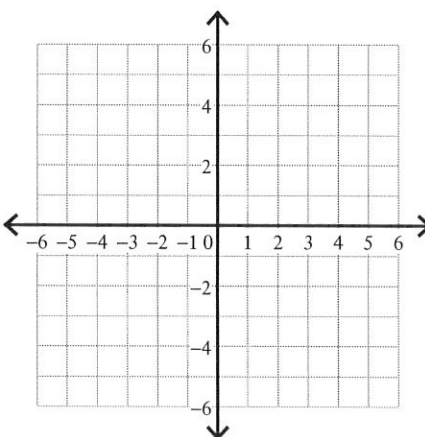
10) $y = 7x - 5$



11) $y = -6x + 5$



12) $y = -\frac{5}{2}x + 5$



Writing Linear Equations

Date _____ Period _____

Write the slope-intercept form of the equation of each line.

1) $3x - 2y = -16$

2) $13x - 11y = -12$

3) $9x - 7y = -7$

4) $x - 3y = 6$

5) $6x + 5y = -15$

6) $4x - y = 1$

7) $11x - 4y = 32$

8) $11x - 8y = -48$

Write the standard form of the equation of the line through the given point with the given slope.

9) through: $(1, 2)$, slope = 7

10) through: $(3, -1)$, slope = -1

11) through: $(-2, 5)$, slope = -4

12) through: $(3, 5)$, slope = $\frac{5}{3}$

13) through: $(2, -4)$, slope $= -1$

14) through: $(2, 5)$, slope $=$ undefined

15) through: $(3, 1)$, slope $= \frac{1}{2}$

16) through: $(-1, 2)$, slope $= 2$

Write the point-slope form of the equation of the line described.

17) through: $(4, 2)$, parallel to $y = -\frac{3}{4}x - 5$

18) through: $(-3, -3)$, parallel to $y = \frac{7}{3}x + 3$

19) through: $(-4, 0)$, parallel to $y = \frac{3}{4}x - 2$

20) through: $(-1, 4)$, parallel to $y = -5x + 2$

21) through: $(2, 0)$, parallel to $y = \frac{1}{3}x + 3$

22) through: $(4, -4)$, parallel to $y = -x - 4$

23) through: $(-2, 4)$, parallel to $y = -\frac{5}{2}x + 5$

24) through: $(-4, -1)$, parallel to $y = -\frac{1}{2}x - 1$